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Sir:

Transmitted herewith for filing is the patent application of

Inventor(s): James F. Cheatham, Fred Milne and Orval L. Englebrecht

For: ONE PIECE SKATE CHASSIS

Enclosed are:

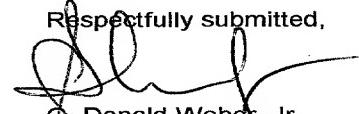
- Two (2) sheets of drawings (informal).
- An assignment of the invention to \_\_\_\_\_
- An associate power of attorney.
- An executed Declaration.
- A verified statement to establish Small Entity Status under 37 CFR 1.9 and 37 CFR 1.27
- A postcard.

The filing fee has been calculated as shown below:

For	Number filed	Number extra	Small Entity	Other than Small Entity
Basic Fee			\$385	\$770
Total Claims	12- 20 =	0	x 11 = 0	x 22 =
Independent Claims	2- 3 =	0	x 40 = 0	x 80 =
Multiple Dependent claims	0		x130 = 0	x 260 =
Total filing fee			\$385	

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- The issue fee set in 37 CFR 1.18 at or before mailing of the Notice of Allowance, pursuant to 37 CFR 1.311(b).
- Any filing fees under 37 CFR 1.16 for presentation of extra claims.

Respectfully submitted,

  
 Donald Weber, Jr.  
 Attorney for Applicant  
 333 City Boulevard West  
 Suite 1610  
 Orange, CA 92868

(714) 634-4540

Docket No. TMI-1

**ONE PIECE SKATE CHASSIS**

by

James F. Cheatham

Orval L. Englebrecht

Fred Milne

LAW OFFICES  
G. DONALD WEBER, JR.  
SUITE 1700  
333 CITY BLVD. WEST  
ORANGE, CALIFORNIA  
92668

(714) 634-4540

BACKGROUND

1. Field of the Invention. This invention is directed to chassis for skates, in general, and to a chassis stamped and formed from a single piece of metal for in-line roller skates, in particular.

5           2. Prior Art. Roller skates and ice skates have been known for many years.

A recent innovation in roller skates is referred to as in-line skates wherein the wheels or rollers are arranged 10 in-line one behind the other, typically, in groups of four.

This arrangement creates a type of footwear which is more akin to an ice skate, than to a conventional roller skate. As a result, roller hockey has become a popular hobby, pastime and even professional sports activity.

15           The typical in-line skate includes a shoe or boot and an attached metal chassis for supporting the rollers. In the past, the metal chassis has been formed by machining a single block of metal to form the desired shape. Alternatively, the frame has been constructed by welding multiple pieces of metal 20 together to form the frame. Of course, these chassis and methods of manufacture have been quite expensive wherein the skates become expensive.

SUMMARY OF THE INSTANT INVENTION

This invention is directed to a skate chassis including 25 sole and heel flanges, which is formed of a single piece of material, typically metal blank stock, which is operated upon in a multiple step, stamping process. This process can include a progressive die technique. The blank stock is pierced, punched, formed, coined, and folded in various steps until a 30 one piece chassis is produced.

Spacers for supporting axles and spacing wheels on the axles are integrally formed in the chassis during the coining

(or extruding) operation.

Optional welding steps can be utilized in order to establish connections between strength imparting braces formed in the chassis.

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**BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 is a perspective view of a skate chassis produced in accordance with the instant invention.

Figure 2 is a side elevation view of a skate chassis produced in accordance with the instant invention.

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Figure 3 is a front end elevation view of a skate chassis produced in accordance with the instant invention.

Figure 4 is a back end elevation view of a skate chassis produced in accordance with the instant invention.

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Figure 5 is a detail view of the extruded spacer provided in a skate chassis produced in accordance with the instant invention.

Figure 6 is a plan view of a representative formation of a skate chassis from a single piece of metal blank stock.

**DESCRIPTION OF A PREFERRED EMBODIMENT**

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Referring now to Figure 1, there is shown a perspective view of a skate chassis 100 produced in accordance with the instant invention. In particular, the skate chassis is preferably designed for the so-called "in-line" skate which supports a plurality of skate wheels (not shown) which are aligned behind each other in a single line.

25

The chassis 100 comprises a pair of spaced apart, substantially parallel sides 101 and 102. The sides are integrally formed with a bottom 103. A front or sole mounting flange 104 and a rear or heel mounting flange 105 is integrally formed with side 101. Complementary mounting flanges 106 and 107 are integrally formed with side 102. The complementary flanges extend outwardly from the respective sides.

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One or more support braces 110 and 111 can be integrally formed with the respective sides 101 and 102. Similar braces 113 and 114 are formed at the rear of the chassis although only brace 114 is visible in Figure 1. In a 5 preferred embodiment, the support braces can be welded together at a joint 112. Braces 113 and 114 can be welded, as well, as described hereinafter.

A plurality of axle spacers 115 are formed on the inner surface of each of the sides 101 and 102, respectively. 10 The axle support holes 120 are formed, at least to some degree, axially through the spacers 115. Thus, the number of spacers 115 is dictated by the number of axles to be supported in the chassis 100.

Typically, the spacers 115 are extruded from the side 15 material. (This process is sometimes referred to as coining.) The technique of forming the spacers 115 integrally with the sides of the chassis avoids the multi-part, multi-step process used in the prior art wherein separate spacers are inserted into the axle support holes 120 in the chassis.

The chassis 100 includes a plurality of apertures or 20 holes 130 and 131 in the mounting flanges 104-107 for receiving fasteners (e.g. rivets, bolts or the like) used to mount a shoe or a boot to the chassis 100. Other embossments 150 and 151 can be included in the chassis for cosmetic and/or strengthening purposes. 25

Referring now to Figure 2, there is shown a side elevation view of a skate chassis 100 produced in accordance with the instant invention. In this view, the side 102 is depicted. (Side 101, seen in Figure 1, is similarly configured.) The rear of the skate chassis is shown on the right in Figure 2. The heel support flange 107 is integrally formed at the top rear edge of side 102. The sole support 30

flange 106 is integrally formed at the top, front edge of side 102.

The support brace 111 is integrally formed at the top, middle edge of side 102. A complementary support brace 110 is 5 formed with side 101 as shown in Figure 1. It is contemplated that support brace 110 or 111 can be appropriately dimensioned to fully extend between sides 101 and 102. However, in the preferred embodiment, support braces 110 and 111 are about equal 10 in dimensions and are welded together in joint 112 at the ends thereof about midway between sides 101 and 102.

The support brace 113 is integrally formed at the top, back edge of side 102. A complementary support brace 110 is formed with side 101 as shown in Figure 1. It is contemplated 15 that support brace 114 or 113 can be appropriately dimensioned to fully extend bewteen sides 101 and 102. However, in the preferred embodiment, support braces 114 and 113 are about equal in dimensions and are welded together in joint 177 at the ends thereof about midway between sides 101 and 102.

Embossments 150, 151 and 152 are shown in Figure 2. 20 The number, placement and configuration of these embossments can be varied as desired. One or more of the embossments may be omitted, if desired. The embossments are intended to provide strengthening (as well as esthetic) characteristics to the chassis 100 but the specific design is not critical.

The apertures 130 and 131 are provided through the 25 flanges 106 and 107, respectively. Appropriate fasteners, such as rivets, screws or the like (not shown), are passed through these apertures to fasten a show or boot (not shown) to the chassis 100.

In addition, one or more gussets 141 are formed 30 between flange 107 and side 102. Similarly, gussets 142 are formed between flange 106 and side 102. The gussets are used

in order to provide additional strength for the chassis. Of course, similar gussets are provided on the other side of the chassis, as well.

The spacers 115 are formed in the side 102 by extruding or coining, as noted supra. The spacers are, in effect, small conically shaped projections which extend inwardly toward the center of the chassis and are located on the opposite surface of side 102. The apertures 120 are axially formed in the spacers 115 and are adapted to receive the wheel supports or axles in the assembly of the skate.

Referring now to Figure 3, there is shown a back end elevation view of the chassis 100. In this case, the back end is consistent with the left end of the chassis 100 as shown in Figure 1.

The view in Figure 3 shows the sides 101 and 102 spaced apart but integrally formed with bottom 103. The support braces 110 and 111 are integrally formed with sides 101 and 102, respectively. The braces 110 and 111 are bent toward each other and, preferably, joined together in a welded joint 112.

The rear flanges 105 and 107, as well as the front flanges 104 and 106, are formed integrally with sides 101 and 102, respectively. The flanges are bent outwardly relative to the sides in this embodiment.

In this embodiment, the upper ends 101A and 102A of sides 101 and 102, respectively, are bent inwardly toward each other to form an "A-frame" style chassis. Support brackets 113 and 114 are joined together at a welded joint 177. The upper ends of the sides are bent together as shown in Figure 3 to provide one style of frame.

The spacers 115 extend inwardly relative to the sides 101 and 102. The spacers assist in the proper spacing of the skate wheels when they are assembled with the chassis.

Referring now to Figure 4, there is shown a back end elevation view of another embodiment of the chassis 100. In this case, the back end is consistent with the right end of the chassis 100 as shown in Figure 2.

5 The view in Figure 4 shows the sides 101 and 102 spaced apart but integrally formed with bottom 103. The support braces 110 and 111 are integrally formed with sides 101 and 102, respectively. The braces 110 and 111 are bent toward each other and, preferably, joined together in a welded joint 112.

10 The rear flanges 105 and 107, as well as the front flanges 104 and 106, are formed integrally with sides 101 and 102, respectively. The flanges are bent outwardly relative to the sides in the preferred embodiment.

15 In this embodiment, the sides 101 and 102, respectively, are substantially parallel to each other and for the "square-frame" style chassis. Support brackets 113 and 114 are joined together at a welded joint 177. This style of frame and the A-frame style shown in Figure 3 are two examples of frame configuration. Other configurations are also contemplated even though not specifically shown and/or described herein.

20 The spacers 115 extend inwardly relative to the sides 101 and 102. The spacers assist in the proper spacing of the skate wheels when they are assembled with the chassis.

25 Referring now to Figure 5, there is shown a detailed view of a spacer 115. As described supra, each spacer 115 is extruded or coined in the side 101 or 102 as appropriate. In particular, the spacer 115 takes a generally conical configuration of material on the inner surface of the relative side. The spacer 115 is defined to include a central axial aperture 120 which has the appropriate diameter to engage and/or interact 30 with the axle 501 which supports the skate wheel 510 when the skate is assembled. Typically, the spacer is, effectively,

countersunk on the exterior of the respective chassis side. The countersunk configuration can be advantageously used to accommodate a flat head screw 502 (and/or axle 503) in order to provide a smooth exterior surface for the assembled skate. Of course, carriage bolts or screws with other head configurations can be used, if desired.

Referring now to Figure 6, there is shown a representative process for forming the one piece skate chassis 100. In this embodiment, the input material or blank is in the form of rolls or sheets of metal, i.e. aluminum, stainless steel, or the like, about 10 to 12 inches wide and about 1/8" thick.

The blank stock 600 is fed into the stamping and forming apparatus (not shown) where it is stamped, cut and formed. The process can take several discrete steps and/or it can be accomplished by use of a progressive die. Typically, in the first step, i.e. Step 1, the general outline of the chassis is formed. Also a plurality of relatively small holes 181 are punched through the blank 601. These holes become the mounting holes for receiving the rivets or other fasteners for securing a boot or a shoe to the completed frame as described above.

Likewise, several (typically eight) axle holes 200, arranged in pairs, are punched through the blank. These holes are used to receive the axles for the wheels of the assembled skate.

Also, several large holes 175 or cutouts are punched through the blank 601 adjacent to and intermediate related pairs of axle holes 200. The holes or cutouts 175 are used to form the openings through which the wheels of the assembled skate protrude.

Some or all of the cuts and stampings can be accomplished concurrently. That is, the various stamping procedures can be accomplished in one or several steps depending upon the

type of stamping equipment utilized. For example, the shape of the front and back ends of the sides 101 and 102 can be formed at Step 1.

In another step such as Step 2, embossments 150 can be made in the blank 602 adjacent to the axle holes 200. These areas of the blank will become the sides 101 and 102 of the assembled frame. These embossments can take any shape or configuration desired. The embossments are, generally, intended to provide strengthening characteristics by including ribs, grooves, ridges or the like. The shapes of the embossments can be circular, rectilinear, elongated ribs or the like to form a desired configuration and can provide design advantages.

In addition, at a convenient time in the process, for example during Step 2, the axle holes 200 are extruded, coined or otherwise formed into short cylinders or cones 115 which extend from the surface of the blank. These cones or cylinders will ultimately be disposed within the formed chassis and provide integrally formed spacers for locating the wheels within the assembled skate.

Once the desired shape has been stamped and/or punched into the blank, the forming of the chassis 100 is initiated. The forming process, as shown in Step 3, typically, begins with a wiping or forming operation wherein the spacer tabs 110 and 111 are bent upward and the boot support flanges 104-107 are bent downward. (Of course, these directions are relative so long as the bends place the respective components in the proper position for the finalized chassis configuration.)

In Step 4, the sides of the chassis 101 and 102 are formed by bending or folding them upward relative to the blank. This operation forms a generally U-shaped channel comprising the sides 101 and 102 along with the bottom 103. At this time the spacer tabs 110 and 111 are formed toward each

other and the support flanges 104-107 are bent away from each other. (Of course, it is contemplated that in some embodiments, the flanges 104-107 may extend toward each other.)

Once the folding or bending has been accomplished, the related spacer tabs 110 and 111, as well as spacers 113 and 114, can be welded together to form a secure, sturdy support structure. The spacer tabs 110, 111, 113 and 114 operate to provide rigidity to the U-shaped chassis. The tabs (or braces) keep the sides spaced apart and also joined together.

In the event that the process was conducted as a series of steps on a single sheet or a roll of material with a plurality of blanks joined together by a connector tongue 650, for example, the blanks will be separated. The separation usually occurs prior to the welding step, if appropriate.

Likewise, the axles and wheels are assembled to the chassis. Thereafter, the shoes or boots are also assembled to the chassis. At this juncture, an in-line skate with a strong, reliable chassis is completed. The chassis is relatively inexpensive to fabricate whereby the costs of making the in-line skates is reduced.

Thus, there is shown and described a unique design and concept of one piece skate chassis. While this description is directed to a particular embodiment, it is understood that those skilled in the art may conceive modifications and/or variations to the specific embodiments shown and described herein. Any such modifications or variations which fall within the purview of this description are intended to be included therein as well. It is understood that the description herein is intended to be illustrative only and is not intended to be limitative. Rather, the scope of the invention described herein is limited only by the claims appended hereto.

CLAIMS

- 1       1. A one piece skate chassis comprising,  
2                a bottom,  
3                a pair of sides,  
4                each of said sides integrally formed at the bottom  
5 edge thereof with said bottom to form a channel,  
6                a plurality of flanges integrally formed at the  
7 top edge of each of said sides, and  
8                axle supports formed in said pair of sides to  
9 receive axles for skate wheels.
- 1       2. The chassis recited in claim 1 wherein,  
2                said axle supports include integral spacer means  
3 for spacing the skate wheels between said pair of sides.
- 1       3. The chassis recited in claim 1 wherein,  
2                said bottom includes a plurality of elongated  
3 apertures therethrough for receiving the skate wheels.
- 1       4. The chassis recited in claim 1 wherein,  
2                said flanges each include at least one aperture  
3 therethrough for receiving fasteners to attach footwear to said  
4 chassis.
- 1       5. The chassis recited in claim 1 wherein,  
2                said pair of sides are substantially parallel to  
3 each other.
- 1       6. The chassis recited in claim 1 wherein,  
2                said pair of sides are inclined toward each other  
3 adjacent said top edge.

1           7. The chassis recited in claim 1 including,  
2                 a spacer tab integrally formed with at least one  
3                 of said pair of sides and further attached to the other one of  
4                 said sides to form a support member for said pair of sides.

1           8. The chassis recited in claim 1 including,  
2                 at least one embossment in each of said pair of  
3                 sides.

1           9. The chassis recited in claim 1 including,  
2                 at least one gusset formed between each flange  
3                 and the associated one of said pair of sides.

1           10. A one piece skate chassis produced by the process  
2                 of:

3                 providing a sheet of blank stock material,  
4                 punching a plurality of apertures through said  
5                 sheets,

6                 stamping said blank to preferred configuration,  
7                 folding said blank after said stamping to form  
8                 a bottom,

9                 a pair of sides integrally formed at the bottom  
10                 edge with said bottom and folded upwardly to form a channel,

11                 a plurality of flanges integrally formed at the  
12                 top edge of each of said sides and folded outwardly, and  
13                 axle supports formed in said pair of sides to  
14                 receive axles for skate wheels.

1           11. The chassis recited in claim 10 wherein,  
2                 said process utilizes a progressive die.

1           12. The chassis recited in claim 10 wherein,  
2                 said material is a metal.

ABSTRACT OF THE DISCLOSURE

A skate chassis formed from one piece of metal by a stamping process.

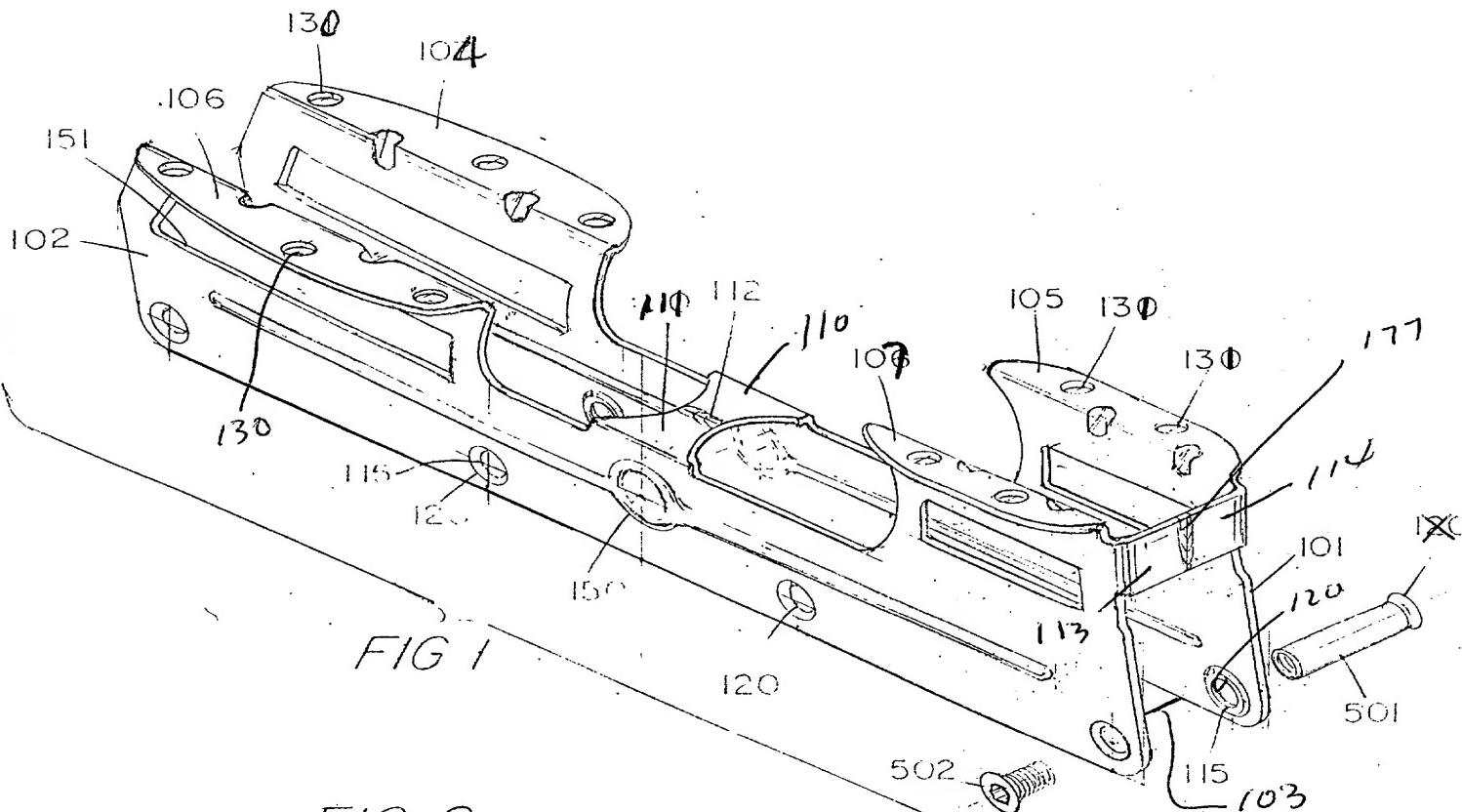


FIG 2

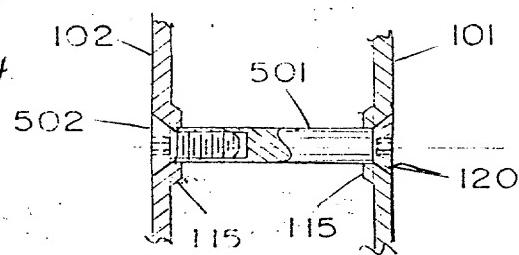
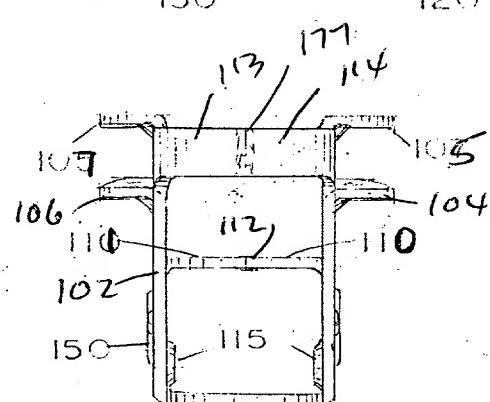
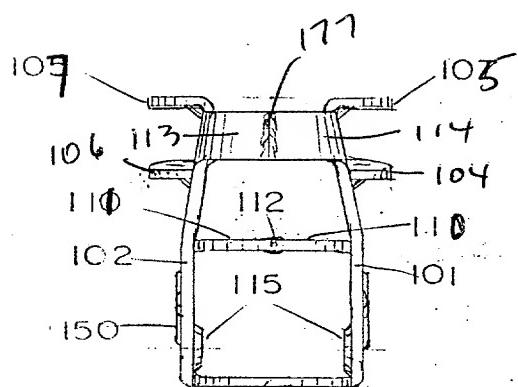
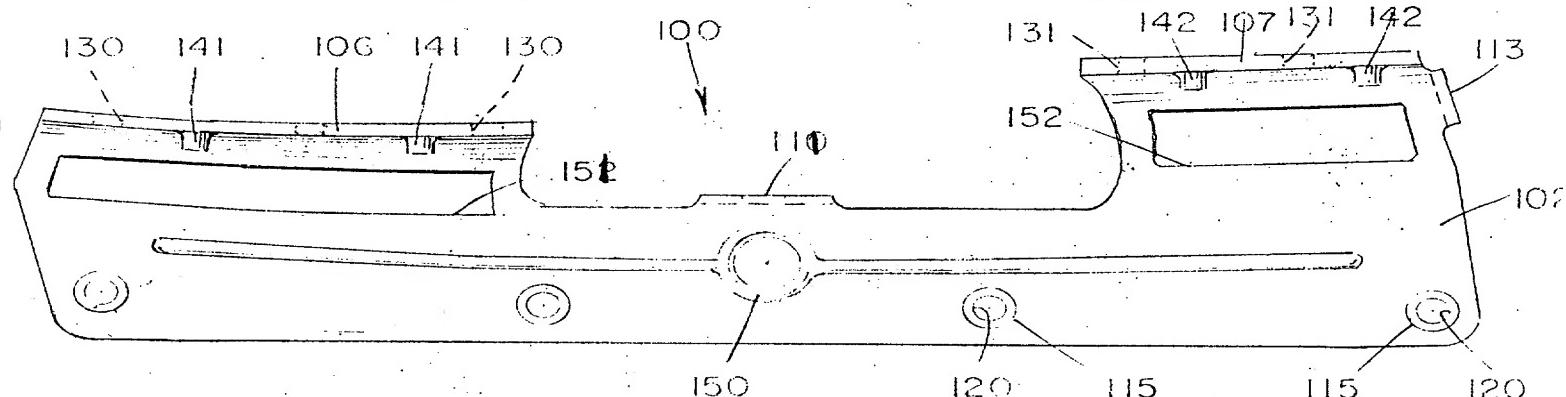
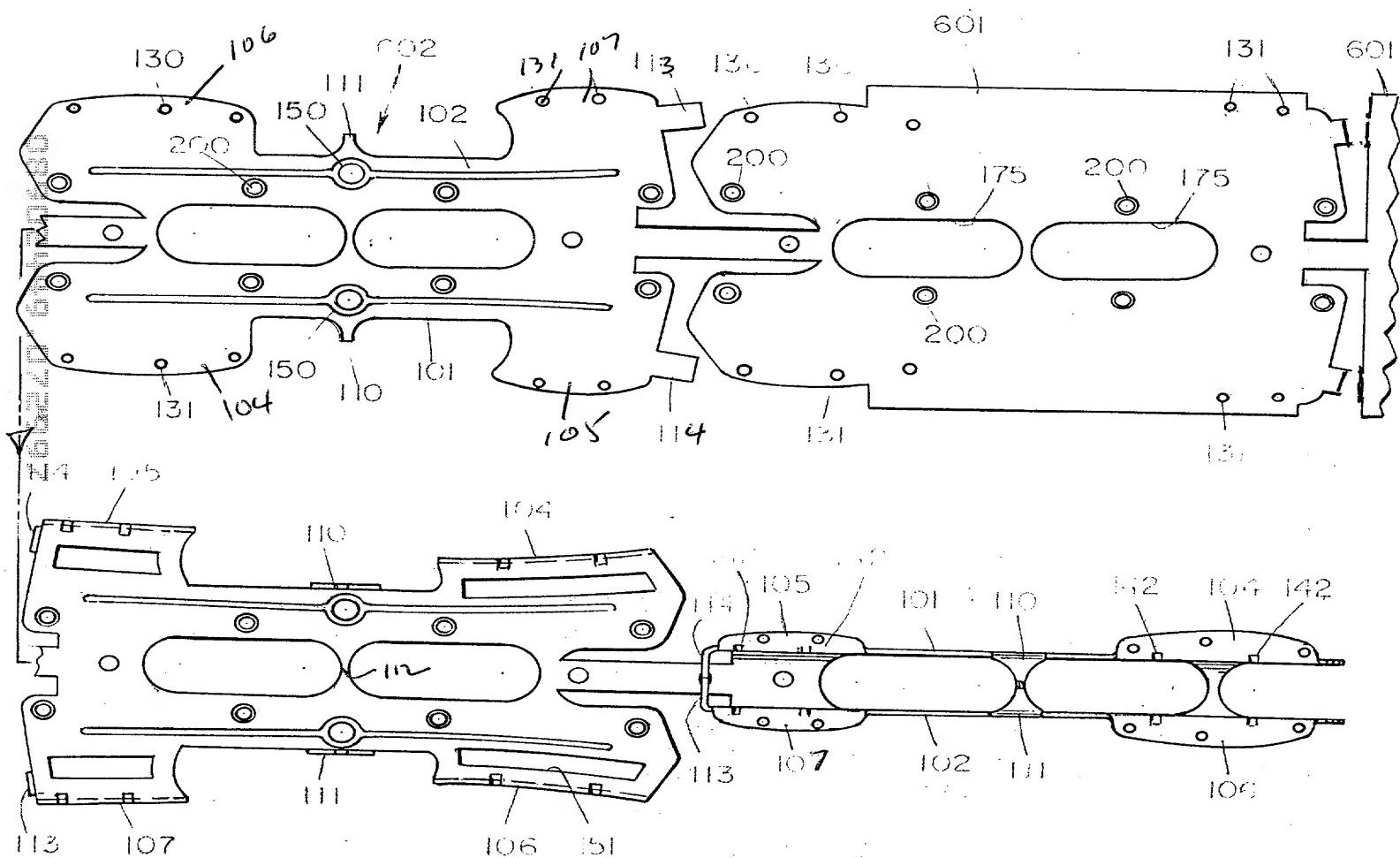


FIG 3

FIG 4

FIG 5

FIG 6



**DECLARATION, POWER OF ATTORNEY AND PETITION - JOINT**

We, James F. Cheatham, Fred Milne and Orval L. Englebrecht, declare that we are citizens of the United States of America residing at 2109 Via Alamitos, Palos Verdes, California 90274; 7071 Warner Avenue, Suite 447, Huntington Beach, California 92647; and 1373 Midsite Street, Covina, California 91722, respectively;

That we have reviewed and understand the contents of the specification, including the claims, as amended by any amendment specifically referred to in the oath or declaration, and we verily believe that we are the original, first and joint inventors of the invention

**ONE PIECE SKATE CHASSIS**

described and claimed therein; that we do not know and do not believe that this invention was ever known or used in the United States of America before our invention thereof, or patented or described in any printed publication in any country before our invention thereof, or more than one year prior to this application; or in public use or on sale in the United States more than one year prior to this application; that this invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by us or our legal representatives or assigns more than twelve months before this application; and that no application for patent or inventor's certificate on this invention has been filed by us or our representatives or assigns in any country foreign to the United States of America except as follows:

**NO EXCEPTIONS**

We acknowledge that we have a duty to disclose to the United States Patent and Trademark Office information of which we are aware and which is material to the examination of this application in accordance with 37 CFR 1.56(a).

And we hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

WHEREFORE, we pray that Letters Patent be granted to us for the invention or discovery described and claimed in the foregoing specification and claims, and we hereby subscribe our names to the foregoing specification and claims, declaration, power of attorney and this petition.

The undersigned petitioners declare further that all statements made herein of their own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge and specific warning that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Inventor's full name: JAMES F. CHEATHAM

Date: 7-23-97

*James F. Cheatham*  
James F. Cheatham

Post Office Address:

2109 Via Alamitos  
Palos Verdes, CA 90274

Inventor's full name:

FRED MILNE

Date: 7-23-97

e: FRED MILNE

**Post Office Address:**

7071 Warner Ave.  
Suite 447  
Huntington Beach, CA 92647

Inventor's full name: ORVAL L. ENGLEBRECHT

ORVAL L. ENGLEBRECHT

Date: 7-23-97

le: ORVAL L. ENGLEBRECHT



Orval F. Englebrecht

**Post Office Address:**

1373 Midsite St.  
Covina, CA 91722

Attorney's  
Docket No. TMI-1

Applicant or Patentee: James F. Cheatham, Fred Milne  
and Orval L. Englebrecht  
Serial or Patent No.: Unknown  
Filed or Issued: Herewith  
For: ONE PIECE SKATE CHASSIS

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) and 1.27(b) - INDEPENDENT INVENTOR**

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled ONE PIECE SKATE CHASSIS described in

the specification filed herewith.  
 application serial no. \_\_\_\_\_, filed \_\_\_\_\_.  
 patent no. \_\_\_\_\_, issued \_\_\_\_\_.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

no such person, concern, or organization.  
 persons, concerns or organizations listed below\*

\*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

FULL NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_  
 INDIVIDUAL       SMALL BUSINESS CONCERN  
 NONPROFIT ORGANIZATION

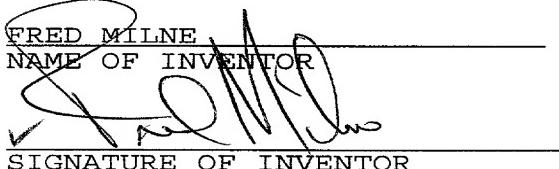
I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

JAMES F. CHEATHAM  
NAME OF INVENTOR

  
SIGNATURE OF INVENTOR

7-23-97  
DATE

FRED MILNE  
NAME OF INVENTOR  
  
SIGNATURE OF INVENTOR

7-23-97  
DATE

ORVAL L. ENGLEBRECHT  
NAME OF INVENTOR

  
SIGNATURE OF INVENTOR

7-23-97  
DATE